

The Cellular Basis of Reproduction and Inheritance

Chapter Objectives

Opening Essay

Explain why cancer cells are dangerous and note several strategies of cancer treatment.

Connections Between Cell Division and Reproduction

- 8.1 Compare the parent-offspring relationship in asexual and sexual reproduction.
- 8.1 Explain why cell division is essential for prokaryotic and eukaryotic life.
- 8.2 Explain how daughter prokaryotic chromosomes are separated from each other during binary fission.

The Eukaryotic Cell Cycle and Mitosis

- 8.3 Compare the structure of prokaryotic and eukaryotic chromosomes.
- 8.4 Describe the stages of the cell cycle. Identify when DNA is replicated, chromosomes are sorted, and two new cells are formed.
- 8.5 List the phases of mitosis and describe the events characteristic of each phase. Recognize the phases of mitosis from diagrams and micrographs.
- 8.6 Compare cytokinesis in animal and plant cells.
- 8.7–8.8 Explain how anchorage, cell density, and chemical growth factors control cell division.
- 8.9 Explain how cancerous cells are different from healthy cells. Distinguish between benign and malignant tumors, and explain the strategies behind some common cancer treatments.
- 8.10 Describe the functions of mitosis.

Meiosis and Crossing Over

- 8.11 Explain how chromosomes are paired. Distinguish between autosomes and sex chromosomes.
- 8.12 Distinguish between somatic cells and gametes and between diploid cells and haploid cells.
- 8.12 Explain why sexual reproduction requires meiosis.
- 8.13 List the phases of meiosis I and meiosis II and describe the events characteristic of each phase. Recognize the phases of meiosis from diagrams and micrographs.
- 8.14 Describe the similarities and differences between mitosis and meiosis. Explain how the result of meiosis differs from the result of mitosis.
- 8.15–8.17 Explain how independent orientation of chromosomes at metaphase I, random fertilization, and crossing over contribute to genetic variation in sexually reproducing organisms.

Alterations of Chromosome Number and Structure

- 8.18 Explain how and why karyotyping is performed.
- 8.19 Describe the causes and symptoms of Down syndrome.
- 8.20 Define nondisjunction, explain how it can occur, and describe what can result.
- 8.21 Describe the consequences of abnormal numbers of sex chromosomes.
- 8.22 Explain how new species form from errors in cell division.
- 8.23 Describe the main types of chromosomal changes. Explain why cancer is not usually inherited.